Science Applications International Corporation
An Employee-Owned Company

Enduring Homeland Security Solutions

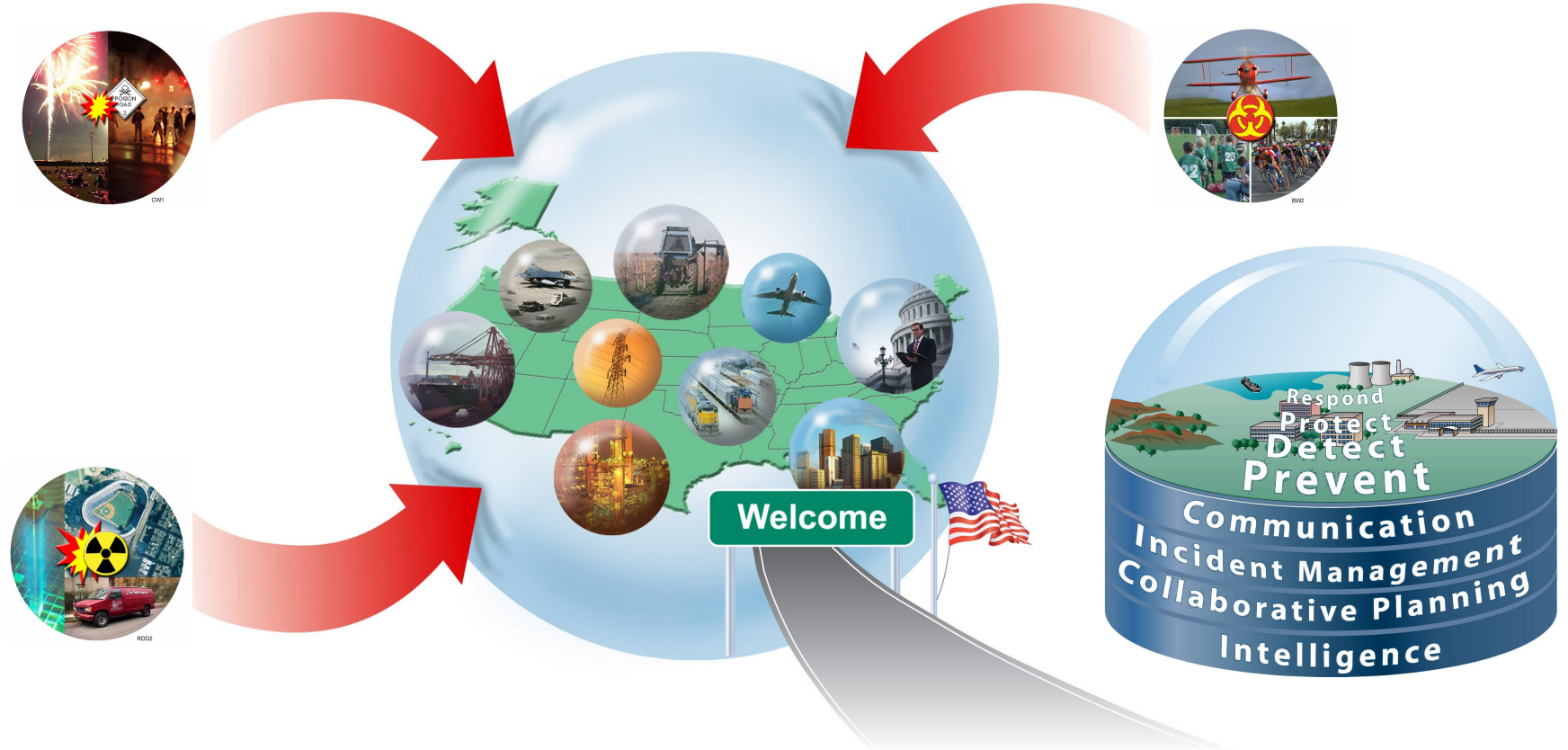
Public Safety Integration Center Capabilities Briefing

Focus on Mandatory Wireless Interoperability for Public Safety Communications

Public Safety Integration Center
SAIC Enterprise Building, McLean, Virginia
December 2002

Enterprise HLS Solutions

The “Security Sphere” and HLS Strategy



Process flow for Homeland Security “Use Cases”

Prevent **Detect** **Protect** **Alert** **Respond**

Enterprise HLS Solutions

Integrated surveillance and sensor systems

LMR & wireless

Predictive and simulation tools

Training & exercise planning, management, and assessment

Biometrics access control

Alerting systems

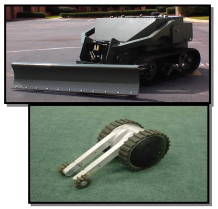
Enterprise Management

C4I Systems (e.g., ASOCC)

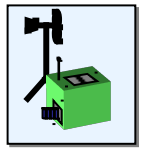
E911 systems

Intelligence sources

UGVs



UAVs

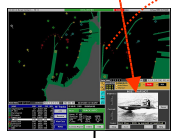


NucChemBio Detectors

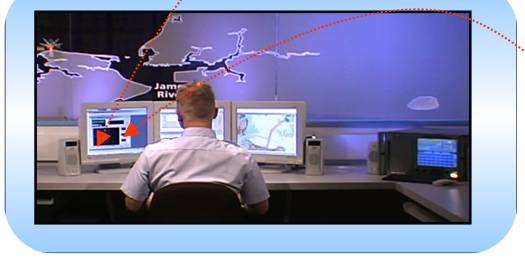
"Robotuna" UUV

RF

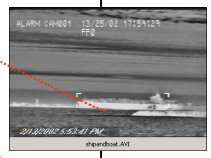
"Owl" USV



IP-based sensor interface :h



Decision Support (DSS)
Computer Aided Dispatch (CAD)
Incident Management (IM)



"Smart" video

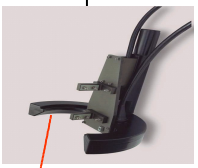
Thermal imaging

FOIDS

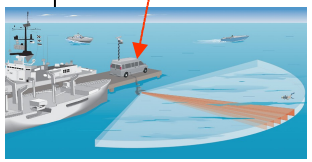
Portal VACIS

Mobile VACIS

Relocatable VACIS



Deployable systems



Underwater swimmer detection

Enterprise HLS Solutions

Integrated C2/ IM / Decision Support / CAD / WMD

Volume surveillance systems

Predictive and simulation tools

Training & exercise planning, management, and assessment

Biometrics access control

Alerting systems

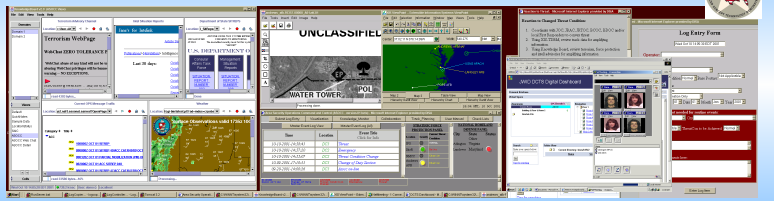
Enterprise management

E911 systems

LMR & wireless

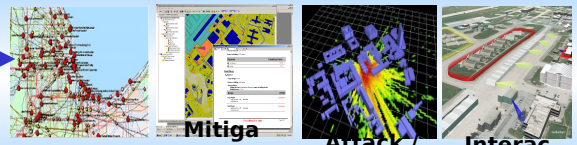
Intelligence sources

ASOCC C2 Toolkit for C2 Collaboration



XML

Mission Degradation Analysis



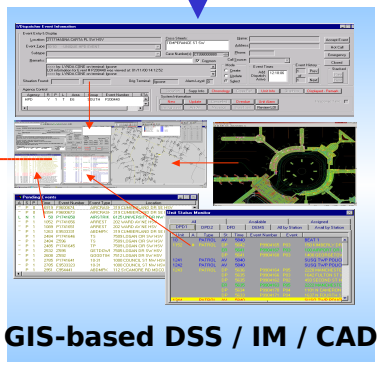
ture network models

Mitiga tion strate gies

Attack / effects modeling

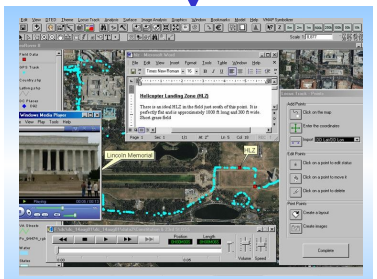
Interac tive 3-D DSS

Decision Support (DSS)
Computer Aided Dispatch (CAD)
Incident Management (IM)



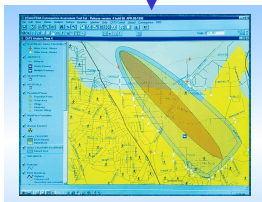
GIS-based DSS / IM / CAD

INTERGRAPH
GOVERNMENT SOLUTIONS



GeoRover II

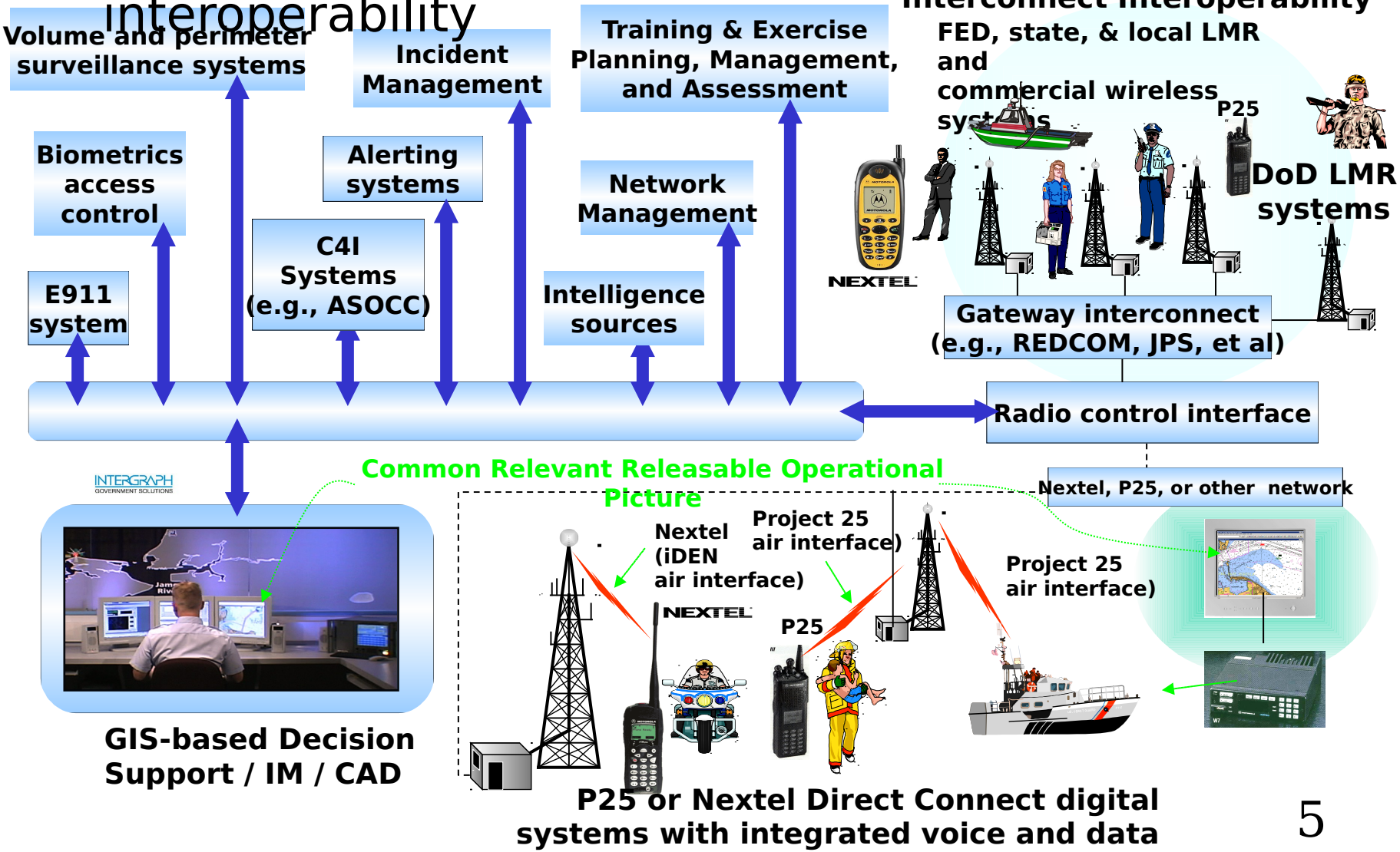
E-Team IM toolkit



Consequence Assessment Tool Set

Enterprise HLS Solutions

Project 25-Nextel patch & interconnect interoperability



Enterprise HLS Solutions

Public Safety Integration Center (PSIC) in McLean, VA

Process flow for Homeland Security “Use Cases”

Prevent **Detect** **Protect** **Alert** **Respond**

Legacy

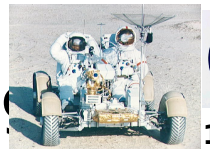
Words of wisdom from radio history

- "…all those who have been working with me, entertain a true feeling of gratitude that wireless … has again helped to save human lives."
- "…*two*† operators, so that one may be on duty at all time. … With two operators, one could be working the news, the other – …[if] properly equipped – could be listening for distress signals."
- "I am proud, but I see many things that will have to be done if wireless is to be be of the fullest utility"
- "Wireless … should not be regulated to death, as it easily could be"
  - "… it simply must be governed in some manner, and the one body fit to do the regulating would be an international board."
  - "All must be considered and must join in the proceedings."

† Emphasis added

Legacy

Results of coastal state PS survey - 199



1972

- **“**It is a common experience for one police agency to not have information concerning the on-going activities of another agency with concurrent jurisdiction. This can prove to be dangerous for all members of the law enforcement community.**”** from a Police Chief in a 1,000,000 person jurisdiction
- Major urban PD cannot communicate by radio with the State Police, nearby towns can’t communicate with the State Police or urban PD
- No broadcast capability into adjacent towns, as well as the inability to call for mutual aid, have put lives and property at risk
- One coastal PD must communicate with Army Corps of Engineers, Drug Enforcement Agency, US Coast Guard, US Navy, US Army campus security, and US Air Force campus security, besides adjacent towns and the State Police - but can’t.

Legacy

Fatal lack of interoperability … - 2001

July 7, 2002

9/11 Exposed Deadly Flaws in Rescue Plan

By THE NEW YORK TIMES

This article was reported and written by Jim Dwyer, Kevin Flynn and Ford Fessenden.

Minutes after the south tower collapsed at the World Trade Center, police helicopters hovered near the remaining tower to check its condition. "About 15 floors down from the top, it looks like it's glowing red," the pilot of one helicopter, Aviation 14, radioed at 10:07 a.m. "It's inevitable."

Seconds later, another pilot reported: "I don't think this has too much longer to go. I would evacuate all people within the area of that second building."

Those clear warnings, captured on police radio tapes, were transmitted 21 minutes before the building fell, and officials say they were relayed to police officers, most of whom managed to escape. Yet most firefighters never heard those warnings, or earlier orders to get out. Their radio system failed frequently that morning. Even if the radio network had been reliable, it was not linked to the police system. And the police and fire commanders guiding the rescue efforts did not talk to one another during the crisis.

Cut off from critical information, at least 121 firefighters, most in striking distance of safety, died when the north tower fell, an analysis by The New York

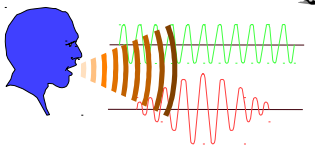
Legacy

Obstacles to interoperability

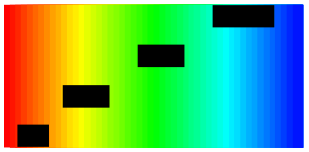
- Organizational
  - No centralized leadership
  - Political & institutional boundaries
  - Limited funding
- Operational
  - Diverse objectives and plans
  - Ad hoc emergency response
- **Signal**
  - **Proprietary digital systems**
  - **No mandated standards**
- Spectrum
  - Disparate frequency blocks
  - Competition for PS spectrum
- Infrastructure & equipment
  - Outdated equipment not supported
  - Lack of high-site infrastructure

Organizational cooperation & ***Trust***

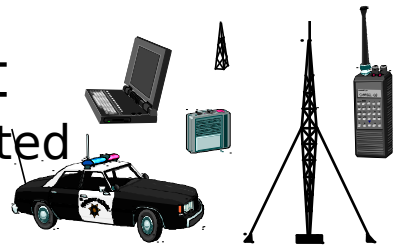
Operational planning



Radio signal form and format



Spectrum bands & assignments

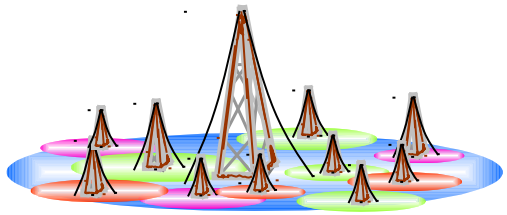


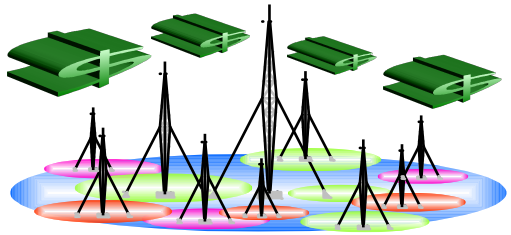
Physical infrastructure and equipment

Legacy and Future

Interoperability with economy of scale

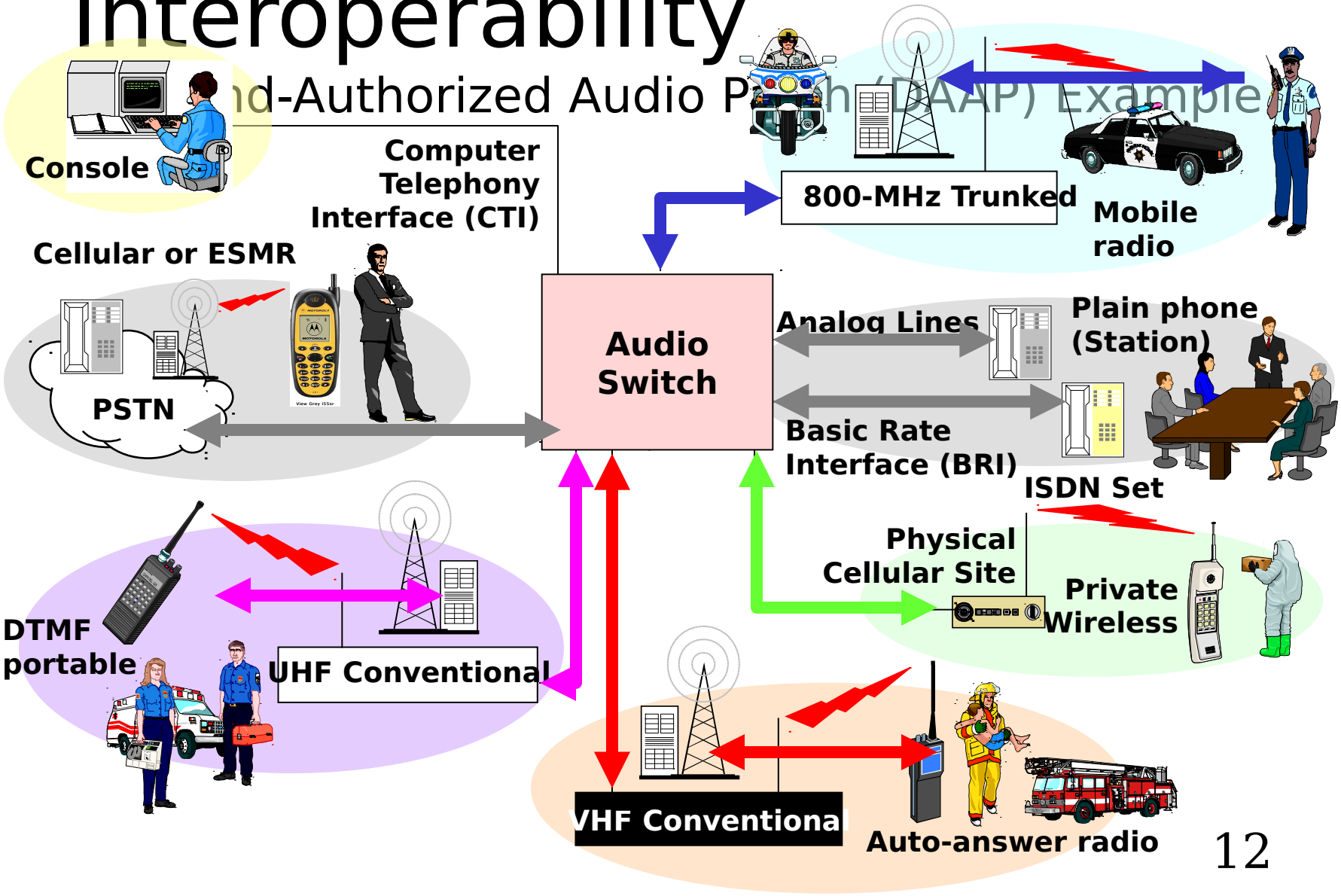
- ***Must*** … have interoperable radio communications between Police, Fire, EMS, Public Service, and even Utilities for public safety
- ***Now*** … many organizations maintain their own independent, often redundant, and inadequate radio infrastructure … like separate communication "islands"
- ***Soon*** … many organizations will have to replace their aging systems with new infrastructure and equipment
- ***Best*** … provide *both* the needed interoperability with new technology, *and* make the most efficient use of public resources with *one shared network vision*





Interconnect Interoperability

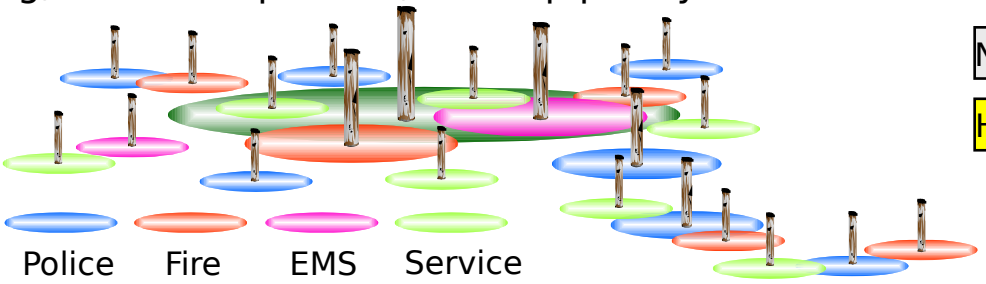
nd-Authorized Audio P h (DAAP) Example

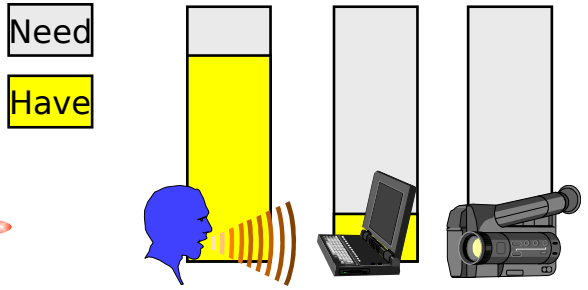


Solution Roadmap

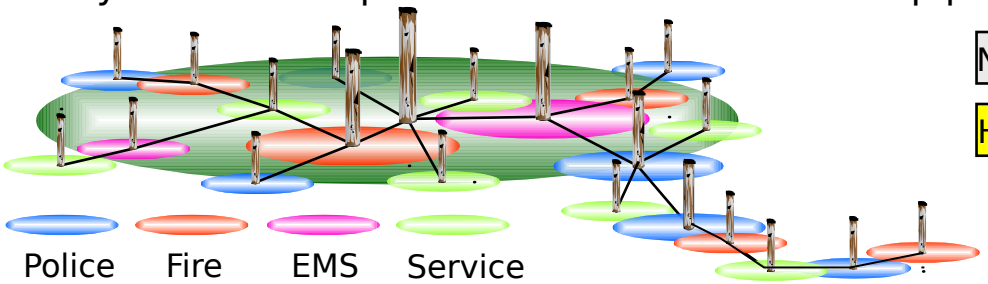
Interconnect interoperability now, then unified network

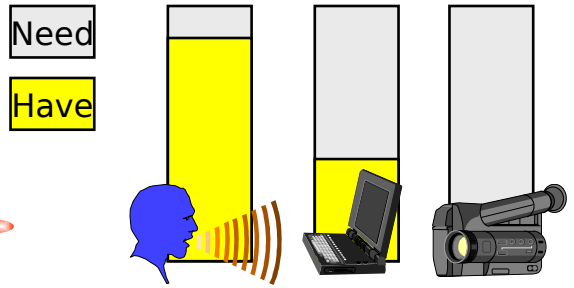
Aging, non-interoperable, “stovepipe” systems



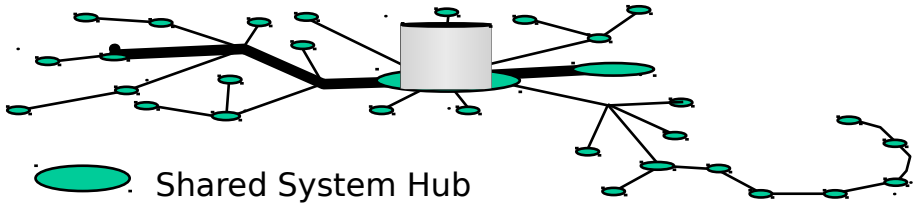


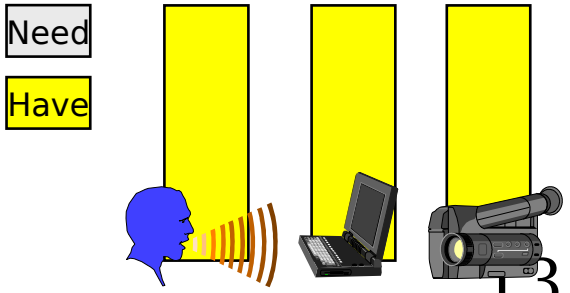
Shared system and disparate interconnect of “stovepipe” systems to backbone network





Single integrated system meeting all media needs for least cost





Enduring Interoperability

Digital Network Management System (DNMS)

- **Talk-group interoperability across disparate systems**
  - Open (IPR-free) DNMS architecture
  - Land mobile radio & commercial services
  - Hardware & software reuse
- **DNMS Consortium**
  - SAIC standards oversight with LMR vendors & telecom providers
- **Progress**
  - Preliminary MOU ‘98
  - NIJ Feasibility Study ‘00
  - PACMERS requirement
  - Preliminary requirements analysis

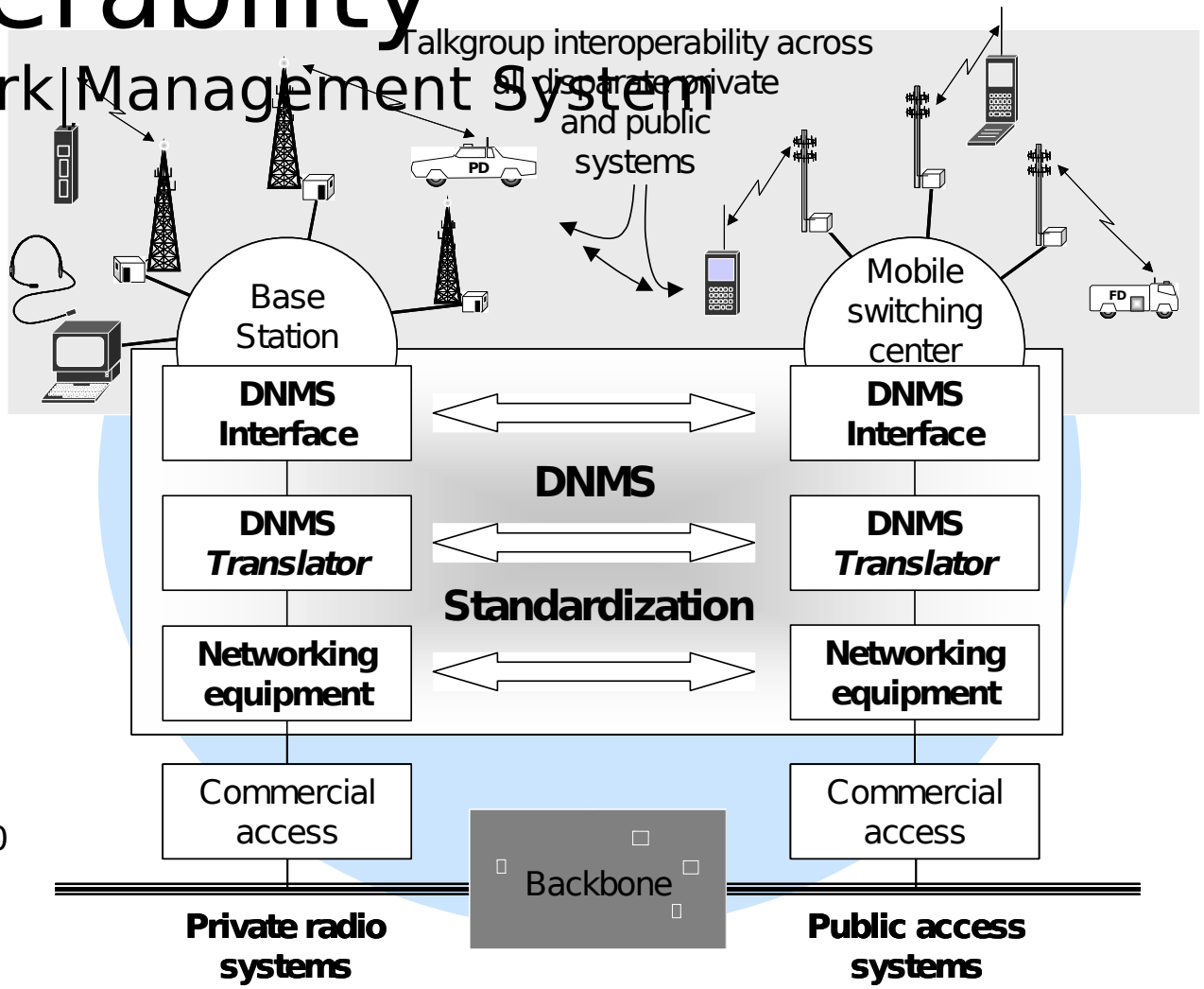


Figure 7.7. The DNMS concept, from Robert I. Desourdis, Jr., David R. Smith, William D. Speights, Richard J. Dewey, John R. DiSalvo, *Emerging Public Safety Wireless Systems*, Artech

Enduring Interoperability

A standards-based “interoperability” model for success

- Automated HF Radio MIL-STD-188-141 …
  - Government-funded standard technical contributions from users, industry, academia
  - Drew best technology from proprietary systems
  - Result is non-proprietary level playing field, no royalties
- Restored interoperability among agencies lost in analog-to-digital technology transition
- Adopted worldwide as de facto interoperability standard

Enduring Interoperability

Emerging systems & services

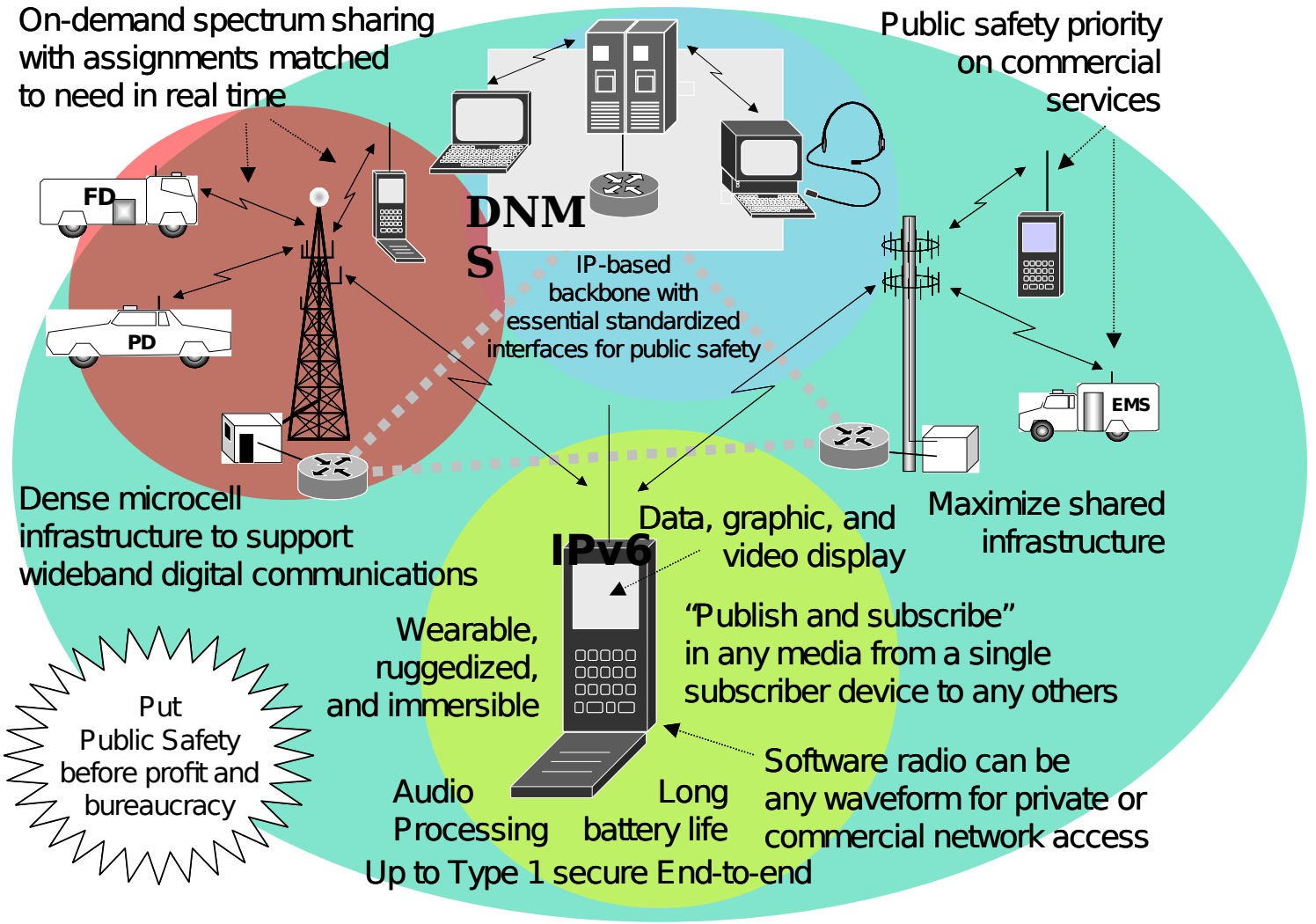

On-demand spectrum sharing with assignments matched to need in real time
Public safety priority on commercial services
FD
PD
DNM S
IP-based backbone with essential standardized interfaces for public safety
EMS
Dense microcell infrastructure to support wideband digital communications
Data, graphic, and video display
IPv6
Maximize shared infrastructure
Wearable, ruggedized, and immersible
"Publish and subscribe" in any media from a single subscriber device to any others
Put Public Safety before profit and bureaucracy
Software radio can be any waveform for private or commercial network access
Audio Processing
Long battery life
Up to Type 1 secure End-to-end

Figure 8.5. Convergence to a unified public safety wireless network vision from Robert I. Desourdis, Jr., David R. Smith, William D. Speights, Richard J. Dewey, John R. DiSalvo, *Emerging Public Safety Wireless*

Enduring HLS Solutions

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